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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/425,015

10/25/1999

TADAHIRO OHMI

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07/16/2002

FITZPATRICK CELLA HARPER & SCINTO
30 ROCKEFELLER PLAZA
NEW YORK, NY 10112

EXAMINER

MONBLEAU, DAVIENNE N

ART UNIT

PAPER NUMBER

2828

DATE MAILED: 07/16/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/425,015

Applicant(s)

OHMI ET AL.

Examiner

Davienne Monbleau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 May 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 and 17-44 is/are pending in the application.
- 4a) Of the above claim(s) 41-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 17-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.


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Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 October 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-12, 17-19, 21-25, 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krasnov (U.S. Patent No. 6,198,762) in view of Choo et al. (U.S. Patent No. 5,781,579). Regarding Claim 1, Krasnov teaches in Figure 1B a compressible fluid supply path structure of a convergent-divergent nozzle type comprising a fluid inlet (3a and 1a), a throat portion (1B) for controlling said compressible fluid to a speed less than a sound speed, a fluid outlet (3B and 1c) and a circulation system (15, 16 and 18). Krasnov does not teach a waveguide unit for guiding microwave into said supply path structure. Choo et al. (U.S. Patent No. 5,781,579) teach in Figure 1 a laser gas structure (51A) and waveguides (54) for guiding microwave into the gas structure. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a microwave source to pump the laser gas in Krasnov, as taught by Choo et al., to produce a high-power laser beam.

Regarding Claim 11, Krasnov teaches in Figure 1B a compressible fluid supply path structure of a convergent-divergent nozzle type comprising a fluid inlet (3a and 1a), a predetermine portion/throat portion (1B) for controlling said compressible fluid to a speed less than a sound speed, a fluid outlet (3B and 1c), temperature correcting means (17A and 17B) and a circulation system (15, 16 and 18). Krasnov does not teach a waveguide unit for guiding

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microwave into said supply path structure. Choo et al. (U.S. Patent No. 5,781,579) teach in Figure 1 a laser gas structure (51A) and waveguides (54) for guiding microwave into the gas structure. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a microwave source to pump the laser gas in Krasnov, as taught by Choo et al., to produce a high-power laser beam.

Regarding Claim 17, Krasnov teaches in Figure 1B a laser oscillating apparatus comprising a gas supply structure of a convergent-divergent nozzle type, wherein said gas supply structure comprises a fluid inlet (3a and 1a), a throat portion (1B) for controlling said compressible fluid to a speed less than a sound speed and a fluid outlet (3B and 1c). Krasnov does not teach a waveguide unit for guiding microwave into said supply path structure. Choo et al. (U.S. Patent No. 5,781,579) teach in Figure 1 a laser gas structure (51A) and waveguides (54) for guiding microwave into the gas structure. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a microwave source to pump the laser gas in Krasnov, as taught by Choo et al., to produce a high-power laser beam.

Regarding Claims 2 and 19, Krasnov does not teach a critical pressure. However, it would have been obvious to one of ordinary skill in the art that the ratio of a pressure at said fluid inlet to a pressure at said fluid outlet must not be less than a critical pressure to ensure minimal shock waves from occurring at the fluid outlet. Prevention of shock waves is a known problem in the art of gas lasers.

Regarding Claims 3, 4 and 21, Krasnov teaches in column 3 lines 22-27 that said path structure is without an inflection point and is thus shaped so as to decrease disturbance caused by said compressible fluid.

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Regarding Claims 5, 6 and 22, Krasnov teaches in Figure 1B pressure correcting means (18) near said fluid inlet.

Regarding Claims 7, 8, 12, 23 and 24, Krasnov teaches in Figure 1B temperature correcting means (17A and 17B), wherein said temperature correcting means has a cooling function and said cooling is effected near said fluid outlet.

Regarding Claims 9 and 25, Krasnov teaches in column 7 lines 56-58 that said throat portion (1c) might have a vertical width of 4mm to 40 mm. Since the width of the throat portion affects the flow velocity, it would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate vertical width adjusting means to further control the flow of the gas.

Regarding Claim 10, Krasnov teaches in Figure 1B that said path structure is symmetric with respect to said throat portion at the center.

Regarding Claim 18, Krasnov teaches in Figure 1B a circulation system (15, 16 and 18).

Regarding Claims 28 and 29, Krasnov teaches in column 5 lines 50-54 that said circulation system comprises a blower (18), such as a fan.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krasnov (U.S. Patent No. 6,198,762) in view of Choo et al. (U.S. Patent No. 5,781,579), as applied to Claim 17 above, and further in view of Azzola et al. (U.S. Patent No. 6,212,211). Krasnov in view of Choo et al. does not teach that said gas is an excimer laser gas. Azzola et al. teach in column 1 lines 26-27 that said laser gas is an excimer laser gas and a mixture of F₂ and Kr. It would have been obvious to one of ordinary skill in the art to use an excimer gas in Krasnov, as taught by Azzola et al., to create a different wavelength laser output.

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Claims 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krasnov (U.S. Patent No. 6,198,762) in view of Choo et al. (U.S. Patent No. 5,781,579), as applied to Claim 18 above, and further in view of Sander et al. (U.S. Patent No. 4,317,087). Krasnov in view of Choo et al. does not teach that said circulation system comprises a bellows pump. Sander et al. teach in column 3 lines 58-65 using a bellows pump in a gas laser to circulate the gas medium. It would have been obvious to one of ordinary skill in the time of the art to use a bellows pump in Krasnov, as taught by Sander et al., because any suitable means may be used to circulate the gaseous medium.

Claims 30, 31, 33-36, 39 and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krasnov (U.S. Patent No. 6,198,762) in view of Choo et al. (U.S. Patent No. 5,781,579) and Ando et al. (U.S. Patent No. 4,911,805). Regarding Claim 30, Krasnov teaches in Figure 1B a laser oscillating apparatus comprising a gas supply structure of a convergent-divergent nozzle type, wherein said gas supply structure comprises a fluid inlet (3a and 1a), a throat portion (1B) for controlling said compressible fluid to a speed greater than a sound speed and a fluid outlet (3B and 1c). Krasnov further teaches in column 6 lines 4-8 an excitation region (22) for producing a laser beam, which coincides with a supersonic section (1c) of the nozzle (1). Krasnov does not teach a waveguide unit for guiding microwave into said supply path structure. Choo et al. (U.S. Patent No. 5,781,579) teach in Figure 1 a laser gas structure (51A) and waveguides (54) for guiding microwave into the gas structure. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a microwave source to pump the laser gas in Krasnov, as taught by Choo et al., to produce a high-power laser beam. Krasnov does not teach a group of path structures connected in a series. Ando et al. teaches in

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Figure 6D and in column 8 lines 48-60 that at least two path structures, of the convergent-divergent nozzle type with throat portions (2 and 2'), may be connected in series. It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a group of path structures connected in series in Krasnov, as taught by Ando et al., to further control and vary the flow velocity of the gas.

Regarding Claim 31, see discussion on Claim 18.

Regarding Claim 33, see discussion on Claim 4.

Regarding Claim 34, see discussion on Claim 5.

Regarding Claim 35, see discussion on Claim 7.

Regarding Claim 36, see discussion on Claim 9.

Regarding Claim 39, see discussion on Claim 28.

Regarding Claim 40, see discussion on Claim 29.

Claim 32 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krasnov (U.S. Patent No. 6,198,762) in view of Choo et al. (U.S. Patent No. 5,781,579) and Ando et al. (U.S. Patent No. 4,911,805), as applied to Claim 30 above, and further in view of Azzola et al. (U.S. Patent No. 6,212,211). Krasnov in view of Choo et al. and Ando et al. does teach that said gas is an excimer laser gas. Azzola et al. teach in column 1 lines 26-27 that said laser gas is an excimer laser gas and a mixture of F₂ and Kr. It would have been obvious to one of ordinary skill in the art to use an excimer gas in Krasnov and Ando et al., as taught by Azzola et al., to create a different wavelength laser output.

Claims 37 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krasnov (U.S. Patent No. 6,198,762) in view of Choo et al. (U.S. Patent No. 5,781,579) and

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Ando et al. (U.S. Patent No. 4,911,805) and Azzola et al. (U.S. Patent No. 6,212,211), as applied to Claim 31 above, and further in view of Sander et al. (U.S. Patent No. 4,317,087). Krasnov in view of Choo et al. and Ando et al. and Azzola et al. does not teach that said circulation system comprises a bellows pump. Sander et al. teach in column 3 lines 58-65 using a bellows pump in a gas laser to circulate the gas medium. It would have been obvious to one of ordinary skill in the time of the art to use a bellows pump in Krasnov, as taught by Sander et al., because any suitable means may be used to circulate the gaseous medium.

Response to Arguments

Applicant's arguments with respect to claims 1-12 and 17-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Iwasaki et al. (U.S. Patent No. 6,259,716) teach in Figure 2 a microwave excited gas laser oscillator comprising waveguides (2), a microwave power source (4), and a gas discharge tube (3). Hoffmann et al. (U.S. Patent No. 4,414,488) teach in Figure 1 a flow channel constructed as a waveguide for a supersonic gas flow which is to be excited comprising a waveguide (1) for a microwave source, a nozzle (3), and a gas supply line (7). Yamane et al. (U.S. Patent No. 5,706,305) teach in the abstract a gas laser comprising waveguides to inject microwaves into the gas flow structure for excitation.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Davienne Monbleau whose telephone number is 703-306-5803. The examiner can normally be reached on Mon-Fri 10:00 am to 6:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on 703-308-3098. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Davienne Monbleau

DNM
July 2, 2002

Paul Ip

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